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# *The* EXTENSION ANIMAL HUSBANDMAN

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Washington, D. C.

THE EXTENSION ANIMAL HUSBANDMAN

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C. D. Lowe, Senior Extension Animal Husbandman,  
K. F. Warner, Animal Husbandman in Meat Extension.

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IS THERE OPPORTUNITY FOR CUTTING COSTS  
OF PORK PRODUCTION THROUGH BREEDING?

By W. A. Craft; Senior Animal Husbandman,  
In Charge of Swine Investigations,  
United States Bureau of Animal Industry.

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During the last half century swine breeders in the United States have established types, breeds, and strains of hogs which met their fancy and were otherwise reasonably well adapted to needs. This has been accomplished through the art of breeding and the breeders who have had a part in this accomplishment deserve praise.

A few months ago I asked one of the foremost authorities on swine in the United States what is the greatest need of the swine producer today? He answered, without hesitating, that this need is for better hogs. In the course of our conversation it developed that we were agreed that breeders need to concentrate their attention in an effort to bring about further improvement in general efficiency and quality of hogs. The producer of hogs is not only interested in cutting costs but also in the per capita consumption of pork and pork by-products, since volume or total output of his pork-producing "machinery" is affected by it. It is generally believed that consumption of pork is influenced to some extent by its quality. Therefore, the producer is interested in producing the highest possible quality of pork consistent with his system of production.

Since animal breeding is both an art and a science it behooves the breeder to combine the science of breeding to the fullest degree possible with his art. Numerous breeders have been highly successful in the art of breeding since the time of Bakewell and at present the number who desire also to make application of the science of breeding appear to be on the increase. However, the science of breeding has not developed very far; due in part to the fact that it is relatively new and in part to the fact that relatively little experimental work in animal breeding has been conducted. Although Mendel's papers on Hybridization of the Garden Pea, which mark the beginning of science in breeding were rediscovered in 1900 it is only during the last 15 to 20 years that attention began to be directed toward application of the Mendelian principles to the larger farm animals.

In Mendel's papers a definite gene concept was formulated and the origin of that concept marks the beginning of an analysis of inheritance part by part. Furthermore, the Mendelian discoveries

postulated that the genes or character determiners occur in pairs, one member of a pair of genes is dominant over the other member, while in other cases the dominance is incomplete. Later studies have revealed that many characters in which the breeder is interested depend on more than one pair of genes and in such cases, size for example, the degree of expression may vary according to the number of genes involved and the effect produced by each gene. Therefore, the breeder's problem is complicated by both dominance and multiple gene action. Due to dominance two animals may be so similar that they appear to be identical for a certain character but when subjected to breeding tests, one breeds true while the other does not. For example, some individuals of the Chester White breed of hogs produce only white pigs in the first cross when mated to pigmented breeds such as the Poland China, since they possess two doses of a dominant gene which inhibits pigment formation in the hairs. Such animals are homozygous for the dominant inhibitor gene. But other Chester Whites when mated with pigmented animals such as the Poland China produce only black pigs in the first cross due to the presence of recessive inhibitor genes which do not inhibit pigment formation. This is due to the fact that the gene which causes black hairs on the Poland China is dominant over the Chester White lacking the dominant pigment inhibitor and the pigs of the litter are black although they have only one gene for black. These blacks are heterozygous as they have a gene for black and one for white and therefore do not breed true. Furthermore, some Chester Whites have only one dose of the dominant pigment inhibitor and are therefore heterozygous for it. Such animals when mated with a Poland China produce both black and white pigs in the same litter as a rule in about equal numbers. Moreover, the blacks in this cross are homozygous for the recessive inhibitor and may be either heterozygous or homozygous for the genes causing black hairs since Chester Whites may also carry black pigment producing genes whose expression is masked by the presence of dominant inhibitors. This is explanation for much variation in the results observed among crosses of black and white breeds of swine.

On a basis of Mendelian principles animals may be classified into two groups; (1) those belonging to the same phenotype, and (2) those belonging to the same genotype. Animals that are identically similar in appearance for a given character belong to the same phenotype. For example all Chester Whites are of the same phenotype for color. Only animals having identically similar combinations of genes are of the same genotype. Thus three Chester Whites belonging to the same phenotype may each have a different combination of genes affecting color and if so each would be genetically different and represent different genotypes.

Selections must obviously be based on the foregoing classification. Phenotypic selection has been practiced since the beginning of man's earliest efforts toward livestock improvement and experience has shown that while it is essential to give critical attention to the phenotype there are frequent disappointments in the breeding pen in the performance of many animals of superior phenotypic individual excellence. These disappointments have emphasized the need for a supplement to phenotypic selection which would increase the certainty of desirable performance by selected animals. Thus pedigree selection had its beginning and although it has aided when carefully combined with phenotypic selection experience has shown that it too is not infallible.

The swine breeder's problem in directing his efforts toward herd improvement involves many considerations. Type, breed characteristics, fertility, suckling performance of sows, motherliness of the sows, rapid rate of growth, efficient utilization of feed, resistance to disease, defects in conformation, number of pigs weaned, and quality of carcass to be produced are factors which the breeder faces when selecting breeding animals. The breeder is faced with the difficulty of properly weighing these considerations when culling a sow herd or purchasing breeding stock. I believe that knowledge as to the exact mode of inheritance of these and other characters would be of much value to the breeder in making selections. The breeder of all classes of livestock has stood in need of a knowledge of the inheritance of different traits in the various species of animals for centuries. Since the inheritance of various traits or characters is usually rather complex it is to be expected that the mode of inheritance must be determined through breeding experiments. Therefore, it is the obligation of the research worker to find if possible the mode of inheritance of all important characters that can be determined with reasonable certainty and make the information available to the livestock breeder in the hope that he may through the application of such knowledge, facilitate further improvement of his farm animals.

Some studies are now in progress and others are being initiated with the object in view of adequately measuring the effects of different systems of breeding and determining the mode of inheritance of various characters in swine. Such knowledge may aid greatly in formulating a constructive plan of swine breeding involving either seed stock or the production of animals for slaughter.

Research studies with swine at several State experiment stations and at the Federal station at Beltsville, Md. during the last 10 years have shown clearly that stock available for breeding purposes actually carries ~~many~~ numerous genes which when brought together in homozygous combinations result in the occurrence of defects in some cases involving constitutional weakness. The presence of undesirable genes although frequently recessive are constantly cutting in on the

producer's profits from swine by increasing his costs. It is to the breeder's interest to locate carriers of undesirable genes, more particularly if they happen to be sires, and avoid using them for breeding. Although animals having exactly the same combination of genes rarely occur in the same herd some of them possess more nearly the ideal combination of genes than others. This makes it difficult or impossible to improve a herd or a breed in all characters at the same time.

I believe that work now in progress at Beltsville and State stations and that will be initiated in the future involving the mode of inheritance of characters, systems of breeding, and progeny performance testing will yield knowledge and methods which should materially aid the swine producers in cutting costs of production through further improvement of types, and breeds and strains of swine in the United States.

A slow rate of growth and low efficiency in the utilization of feed are usually expensive traits. Under experimental study variations in time required by pigs within a litter, and on identical rations and under similar management, to attain 225 pounds weight are ranging from one or two days to as much as 100 days, and the feed required to produce 100 pounds of gain is observed to vary among litters within a breed from about 325 to more than 500 pounds. Although these figures represent extremes they suggest that for swine there must now exist opportunity for appreciable cutting of costs of production through breeding, particularly if more effective methods of supplementing phenotypic selection than now used are found. Perfection of adequate and practical means of recording variations should be conducted simultaneously with character-inheritance studies.

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#### NEW SHIPPING LOSS DATA AVAILABLE

The National Live Stock Loss Prevention Board has issued the following valuable reports:

- |            |   |   |   |
|------------|---|---|---|
| Report No. | 2 | - | Survey of Hog Losses from Bruising                |
| "          | " | 3 | - Survey of Cattle Losses from Bruising           |
| "          | " | 4 | - Survey of Sheep Losses from Bruising            |
| "          | " | 5 | - Survey of Veal Calf Losses from Bruising        |
| "          | " | 6 | - Livestock Losses in Transit during 1935.        |
| "          | " | 7 | - Winter Survey on Livestock Losses from Bruising |

These reports are available on application to H. R. Smith, General Manager, Live Stock Exchange Bldg., Union Stock Yards, Chicago, Ill.

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## PERSONNEL NOTES

### Indiana

Henry H. Mayo, former county agricultural agent in Olmstead County, Minnesota, has been added to the animal husbandry extension staff at Purdue University.

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### Ohio

L. K. Bear, former county agricultural agent in Union County, Ohio, was appointed an animal husbandry specialist in the same State on May 1, 1936, as an associate to L. P. McCann. J. W. Wuichet continues to devote most of his time to the adjustment program.

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### Oklahoma

Paul G. Adams was granted leave of absence from the position of extension animal husbandman at the A. & M. College on June 15 to become the executive vice-president of the National Live Stock Exchange, with headquarters at Chicago, Ill.

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### North Carolina

H. W. Taylor is now the State swine specialist with W. W. Shay acting as assistant.

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### New York

The present organization for animal husbandry extension work in this State includes the following:

- S. J. Brownell, State leader general livestock and dairy project
- H. A. Willman, leader in adult work other than dairy
- K. L. Turk, supervisor of meat cutting
- Gordon Cairns, assistant in meat cutting
- Earl H. Hanson, supervisor, horse work.
- George Pringle, supervisor, disease control

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### Texas

Lester Young is now assistant in swine extension. M. K. Thornton, Jr., is extension leather specialist and has an important part in the home-industries program of his State. He conducts demonstration schools in tanning, in processing, and in the fabrication of leather goods and also prepares leather exhibits and organizes cooperative community tanneries.

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### Wyoming

Anton Fellhauer, former county agricultural agent in Hot Springs County, Wyoming, has been appointed livestock extension specialist for the University of Wyoming.

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## SOME EXTENSION ACTIVITIES IN CALIFORNIA

By L. H. Rochford,  
Extension Specialist in Animal Husbandry

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### Breeding Herd Management

Numerous California range cattlemen are cooperating with our extension service in adjusting their herd management programs. This active cooperation has been largely due to rather marked changes in economic conditions, which directly affect the beef-cattle business of this State. A few of the major changes are: (1) A rapid increase in the percent of demand for lightweight slaughter cattle in Pacific Coast markets; (2) a broader outlet for feeder cattle in California; (3) increased production costs due to greater competition for land use; and in some areas (4) a decrease in the amount of National Forest and public-domain land available for grazing.

The above conditions are forcing many range producers to shift from the practice of selling aged grass- or hay-fed beef for direct slaughter to the practice of selling feeder cattle of younger age. To make such a shift the average producer must make some change in type of cattle, and decided changes in methods of handling and feeding. Our extension program has approached this problem from many angles.

Numerous cattle-grading demonstrations have been held in the range area. At these demonstrations the breeding cow herd is divided usually into three classes. Classification is also made of the available range bulls. Emphasis is given to selective breeding for the production of replacement heifers and stress is also laid on selection of range bulls best suited for mating with cows of the various classes. We also grade feeder and slaughter cattle at these demonstrations where such animals are available. In the grading of market cattle the animals are sorted according to the U. S. standard market grades and the best utilization of the various grades is emphasized. The cattle-grading demonstrations, which have usually been held at well-known ranch headquarters, have been directly responsible for new management programs on many ranches. Some thirty of these ranches are now actively cooperating with the extension service on such matters as selective breeding, rotation of bulls, supplemental feeding of the cow herd and weanling calves, meadow improvement, and range management. The animal husbandry division of the college of agriculture is now aiding the program by placing a few superior type bulls from the university herd with cooperators for demonstration purposes. In one range county, last fall, 16 purebred Hereford bull calves were taken

by 4-H Club members for project work. These will be grown out for a year and then sold to local rangemen. Other counties are watching the results of this 4-H Club activity and if successful the project will probably be expanded considerably. One of the problems in the range country has been to get the right type of range bulls which are adapted to local range conditions. Purchase of short-yearling bulls which are held on the home ranch for one year before range service seems to be a practical way of meeting this problem.

Under the leadership of the farm-management specialist a three-year cost of production study is now under way on over 60 beef-cattle ranches in the range area. The first year's records, just completed, indicate that the study will bring forth valuable information to individual producers and assist in the future development of the whole herd-management program.

#### California Ram Sale and Wool Show

Each year in the latter part of May there is held at the State Fair grounds in Sacramento the California Ram Sale and Wool Show. The two affairs are sponsored by the California Wool Growers' Association. The agricultural extension service and animal husbandry division of the college of agriculture cooperate with the wool growers' association in these two events which attract large crowds of sheepmen from all parts of California and some from nearby States. The function of the ram sale is to serve as a reliable clearing house for a large number of superior-type stud and range rams. The wool show is held solely for educational purposes. It is under the direct supervision of Prof. J. F. Wilson, who is in charge of wool investigations at the college, assisted by the livestock extension specialist. The first aim of the wool show is to help growers to know more about the characteristics, quality, and market value of their wool clips. The second function is to emphasize the importance of constructive breeding practices which will result in improvement of both wool and lamb crops. Therefore, the activities of the ram sale and wool show are largely coordinated. Growers are urged to exhibit fleeces at the wool show which are representative of their wool clips. Some exhibitors enter average fleeces and also select outstanding fleeces to compete for special trophies. There are three main divisions to the wool show: Division 1, for exhibits of purebred fleeces only; Division 2, market classes for fleeces from grade sheep with a special section for exhibits from range flocks representing 1,000 ewes or more; Division 3 is open only to 4-H Club and Future Farmers' exhibits. In each division judging is done according to grade by a competent representative of the wool trade. The winning exhibits in each division compete for special trophies. A tag bearing the following information

is placed on each fleece exhibited: Grade, estimate shrinkage, grease weight, clean weight, total ranch value, and ranch value per pound. Each exhibitor receives this information on his entries. Complete information on all exhibits is later published in the California Wool Grower, official organ of the California Wool Growers' Association, which reaches most of the sheepmen in the State.

The 1936 California Ram Sale and Wool Show was held May 27 and 28. A total of 1,671 rams were sold for an average price of \$42.77 per head. One hundred seventy purebred ewes were sold for an average of \$19.56 per head. This seed stock was well distributed about the State with several head going to Oregon and Nevada.

The 1936 Wool Show brought out 167 entries representing 19 California counties and a few entries were made from Oregon and Wyoming. In size, quality of exhibits, and general interest the 1936 show surpassed shows of former years.

#### Feedlot Records

In the past most feedlot finishing of cattle and lambs in California has been done in central feedyards, by so-called commercial feeders, or by custom feeders. This probably is due to the fact that the cattle and lambs are produced largely by stockmen who do not raise finishing feeds and because the farmers have not been livestock minded. In recent years there has been some trend towards ranch feeding, and a lot of interest in the subject on the part of general farmers. To accumulate local information on results obtained from ranch or farm feeding, numerous records have been obtained by the county agents and the livestock specialist. One of the objects of securing these records has been to compare ranch feeding results with central feedyard results. Last year we had an opportunity to obtain a great amount of additional information to make such comparisons. The South San Francisco Union Stockyards Company operates a custom feedyard where thousands of cattle and lambs are fed annually. Through the courtesy of the stockyards company the results of four years cattle and lamb feeding operations were made available to the agricultural extension service for publication. The feeding records were analyzed and summarized by H. R. Guilbert, animal husbandry division, and L. H. Rochford, livestock specialist. Space will not permit giving in detail the analysis of the records. Because of the large number of animals included, however, the averages shown in the summary table should be of some significance.

Summary of four-year feeding records of cattle and lambs

<u>Item</u>	<u>Cattle</u>	<u>Lambs</u>
Number of lots - - - - -	217	114
Number of head - - - - -	19,588	105,384
Initial weight per head (lbs.) - - - - -	820	63.5
Final weight per head (lbs.) - - - - -	981	79.3
Average days fed - - - - -	63	53
Average daily gain (lbs.) - - - - -	2.55	.299
Average daily ration:		
Concentrates (lbs.) - - - - -	17.9	1.7
Roughages (lbs.) - - - - -	8.8	1.4
Feed per 100 lbs. gain:		
Concentrates (lbs.) - - - - -	700	562
Roughages (lbs.) - - - - -	344	476

In making the analysis, the lots of cattle and lambs were grouped according to average weight, length of feeding period, and type of ration fed. The detailed results have been printed and distributed to producers through the county agents. The official papers of the California Cattlemen's Association and the California Wool Growers' Association have also published the results.

Feed Grinding Demonstrations

Throughout the year 1935 the agricultural extension service, the animal husbandry division, and the agricultural engineering division of the California college of agriculture received an unusual number of inquiries about feed mills and the preparation of feeds for livestock. Because of the great volume of requests it seemed desirable to conduct a series of field meetings and demonstrations relative to this subject. Early in 1936 31 such meetings and demonstrations were held in leading livestock and grain counties. For the demonstration phase of the meetings the agricultural extension service truck was put into service. It was equipped with two small-sized common types of mills, a burr mill, and hammer mill, which were operated from a power take-off on the truck. Previous to schedule of meetings, the extension specialist in agricultural engineering, J. B. Fairbank, reviewed the large amount of experimental work which has been done at several experimental stations on the performance of different types of feed mills. In addition, Mr. Fairbank conducted grinding tests with the two mills which were to be used for demonstration purposes. Likewise the dairy specialist, G. E. Gordon, and the livestock specialist,

L. H. Rochford, reviewed the trials of numerous experiment stations to support recommendations on preparation of concentrates and roughages for various classes of livestock. The engineering specialist attended each of the meetings to discuss the engineering phases of the program and to demonstrate the operation of the two types of mills. His discussions included an explanation of the characteristics of the different types of mills, and cost of operation when grinding to various degrees of fineness, together with many points on how to obtain maximum efficiency from feed mills. In sections where dairying predominates, the dairy specialist attended the meetings. Where the feeding of meat animals is of major interest, the livestock specialist attended. In a few instances both dairy and livestock specialists took part in the program. At each meeting the discussion of feeding included recommendations on the preparation of all California concentrates and roughages. Likewise, it was made clear that our purpose was not to promote the sale of feed mills. In fact, from figures presented on costs, it was made quite clear that certain small operators could have their feeds custom ground, rolled, or chopped more economically than they could prepare such feeds at home.

Over 2,000 stockmen and dairymen attended the field meetings. They displayed a keen interest in all phases of the program. Judging from the representative attendance of producers, the many individual problems presented, the general interest, and demands for additional meetings, this extension activity has apparently been quite worth while

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#### TENNESSEE CLUB BOYS BUY HORSES

Bells Chapel and Medina 4-H clubs of Gibson County, Tennessee, bought 19 grade Percheron mares for a workstock production club project. Interest in the project was developed by County Agent T. R. Wingo and club leaders of the communities. The mares were distributed to the club members on January 7 at a cost of \$137 per head.

On January 13, 22 grade Percheron mares were purchased by 15 farmers and club members of Henderson, Decatur, Gibson, and Hardin Counties. The 22 mares were more mature than those in the first group and many of them well along in foal. They averaged \$162.73 per head. Two more carloads of mares were distributed at Union City and Jackson in January.

---L. A. Richardson, Tennessee Livestock Specialist,  
in Agricultural Leaders' Digest

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## IMPROVING NEW YORK FARM FLOCKS

By H. A. Willman, Ext. Asst. Prof. Animal Husbandry,  
New York State College of Agriculture.

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There is a tendency in this State towards more interest in sheep, better production methods, and less dependence on the scavenger idea of management.

A year ago sheepmen in New York identified their business with a definite program which emphasized the value of (1) the use of purebred rams, (2) parasite control, (3) docking and castrating, (4) graining their ewes before and after lambing, and (5) better marketing. Eight counties which adopted this lamb improvement program used as their campaign slogan "Make Empire Lambs Better."

Notwithstanding our favorable production and marketing opportunities, there is a great need and field for improvement in the quality of our native lambs. A recent study of the sale of 98,000 head of lambs on a large eastern market indicated that a large percentage of our lambs were not topping the market. Thirty-two percent of the lambs appeared to be affected with parasites, 20 percent were culls, and a surprisingly large percentage were not docked or castrated. This survey, combined with a similar picture which was revealed from a study of practices in handling 103 farm flocks, served as a basis for the program which our eight counties adopted. About one-fourth of our sheep population is represented in these counties.

Service letters and cards, barn meetings, and sheep field meetings were used to stimulate interest in many improved sheep management practices. During the past year, 79 method demonstrations were conducted at which there was an average attendance of 54 persons.

The program was terminated in contest form. A winning county was selected on the basis of the largest percentage of growers who most closely followed the practices which were outlined in the program. Livingston County, the winner, as an award for their achievements, received a bronze trophy which was offered through the courtesy of interests at the Buffalo Stock Yards.

A report of the practices of 208 farm-flock owners and co-operators in the program was used in determining the county awards.

A summary of these records is now serving as an object lesson to many of the growers. Of the 208 cooperators 79.3 percent reported satisfactory returns last year, while 20.7 percent said that their returns were low. Why did some of these flocks pay better than others? How often are flocks drenched on the average and what percent of the flocks were drenched? Does it pay to dock and castrate lambs for market? A study of the practices which were followed in the flocks in comparison to returns tends to indicate that faulty practices were responsible for low returns in many flocks.

As might be expected a greater proportion of the growers who reported satisfactory returns:

- (1) Used purebred rams,
- (2) Drenched their flocks more frequently,
- (3) Dipped their flocks,
- (4) Docked and castrated their lambs,
- (5) Topped out their lambs for market.

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#### SUMMARY OF MISSOURI SHEEP PROJECTS

Missouri flock owners who attended 18 cooperative sales in 1935 bought 623 rams at an average of \$26.88. Through other efforts in bringing breeders and purchasers together an additional 1,470 registered rams were placed, which was an increase of 700 over 1934.

Lambs were posted at the ram sales to acquaint farmers with the presence of parasites in their sheep. The total number of sheep treated during the year was 408,390, the highest previous record having been attained in 1934 with 186,960 sheep receiving the treatment. One county agent, who attended a ram sale with a few of his farmers, had 50 requests for instructions in drenching sheep as a result of the demonstration.

Similar progress to a new high record was made in the campaign for docking and castrating lambs to improve the quality of the product, and thereby obtain higher prices. The number so handled in 1935 was 796,680 as compared to a previous high figure of 552,570 in 1934.

Farm flock records show 142 percent lamb crop marketed by efficient producers. The feed cost per ewe and lambs amounted to \$3.16 per ewe. Wool receipts per ewe amounted to \$1.07. Lamb receipts per ewe were \$7.22, leaving a return of \$5.15 per ewe for labor, interest, taxes, and depreciation. The percentage of income from wool was 13 percent and from lambs 87 percent.

-----T. A. Ewing, in 1935 Annual Report

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## ANIMAL HUSBANDRY PROGRESS IN MISSISSIPPI

By F. J. Hurst, Extension Editor,  
Mississippi State College.

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Animal husbandry extension work was begun in Mississippi in 1915 by Frank W. Farley who was employed in cooperation with the Animal Husbandry Division of the U. S. Bureau of Animal Industry. Paul F. Newell is the present project leader, assisted by C. J. Goodell.

The agriculture of Mississippi has developed in the main around cotton. Lumber has furnished Mississippi's principal industrial diversification. The importance of beef-cattle production in the brown loam and prairie areas of the State in supplementing cotton as a major source of income was recognized by the extension service from the beginning. The advent of the boll weevil supplied an immediate need for livestock production in order to balance farm cash outlays.

Large numbers of registered beef-bred bulls were brought into the State from 1914 to the close of the World War. The first 4-H calf club in the United States, according to records of the Bureau of Animal Industry, was established in Hinds and Madison Counties, Mississippi, in 1915, by Frank W. Farley. The quality of cattle fed in demonstration projects and shipped is illustrated by the following quotation from an early extension report, "On June 2, 1918, Joe J. King sold 19 head of steers which he had fed on his farm at Swan Lake, Tallahatchie County, for \$17.17 per hundredweight. The next week Hurdle Bros., Holly Springs, sold four cars for \$17.25 per hundredweight." Mr. King sold another load on the St. Louis market for an all-time high of \$17.85 per hundredweight.

A considerable portion of the State was quarantined against the free movement of cattle, during the first several years of animal husbandry extension work, due to the presence of the cattle-fever tick. Cattle liquidation, the result of low prices following 1920 wiped out many newly established herds. However, many herds established between 1914 and the close of the World War weathered depression years and became the nucleus of later developments. Some cattlemen during the period of low prices took advantage of the situation by replacing grade cows with registered females of good breeding and individuality.

Demonstrations are being conducted in the carrying of beef

herds on higher planes of nutrition, through furnishing improved and ample grazing and by winter feeding. The trench silo has proved particularly valuable in making available cheap winter roughage. This year the week, March 30 to April 4, was set aside by Governor White as trench-silo week, for the planting of silage crops and the planning of more silos. The animal husbandry specialists have cooperated with the soil conservation program in planning a more permanent and self-sufficing State agriculture, which it is maintained, must be balanced with livestock.

The Sardis and Port Gibson livestock shows of the past year and last year's beef-cattle exhibits at county fairs evidence the wider base upon which the present cattle improvement rests in the State. Stocker sales will be held at Port Gibson and Sardis, as a result of commercial cattle development about these points.

Hog extension work has been responsible for changing from unimproved stock to the good type of hogs found in the State today, and the major credit for this change is due 4-H Club pig demonstrators. The first 4-H pig club was organized in Oktibbeha County in 1909, and since that time more than 60,000 Mississippi boys have been enrolled in 4-H pig club work. Animal club work was taken up systematically in the State, in 1915, when P. H. Sanders was appointed State pig-club agent. That year there were enrolled in the State 1,607 boys between the ages of 10 and 18. The next year the enrollment grew to 3,022; in 1917, to 4,227; and in 1918, to 10,559.

In November 1916, 62 pork pig club members met at Yazoo City and under the leadership of their county agent, W. R. Ritch, made the first cooperative shipment of livestock from the State. From this beginning cooperative livestock marketing has spread to all counties of the State. L. A. Olson, county agent of Lafayette County, assisted 349 farmers in the cooperative marketing of 18 full cars of fat hogs in 1919.

Hog extension projects have been designed especially to improve the quality of pork grown for home consumption. Hog slaughtering and pork cutting, curing and smoking demonstrations have been conducted in communities surrounding 42 pork-curing plants which have been established in the State. These plants were established as the result of the extension meats program in which the State extension division was assisted by K. F. Warner, animal husbandman in meats extension of the U. S. Department of Agriculture. The State extension meats program will be expanded another year through the installation of approximately a dozen W.P.A. curing plants in localities not

served at this time. The policy of training county agents through method and result demonstrations has enabled the animal husbandry unit to considerably broaden its service and take care of expanding needs.

Meat-storing demonstrations, using refined cottonseed oil are being conducted as the result of recent research findings and promise to improve markedly the quality of home-cured and stored meats for the farm table. Beef and lamb cutting demonstrations are being conducted over the State in connection with the organization of meat rings. The present rapid development of convenient freezer storage is facilitating the handling of fresh farm meats and promises to increase the consumption of beef and lamb on farms.

Horse and mule extension work in the State has been predicated on research of the Mississippi Experiment Station, including unpublished results, the work of other stations, and field observations. The value of adequate feeding and proper care and management in increasing workstock efficiency and longevity has been demonstrated, and the lessons of such demonstrations need broadened application in all sections of the State. The use of medium-sized Percheron stallions of good quality has been responsible for the production of more satisfactory mule mares, and these mares bred to smooth, large-boned American jacks have produced superior workstock on many farms. The State at present is producing 25 to 30 percent of workstock replacement needs, according to recent estimates.

Interesting work has been done recently with large hitches. T. C. Potts, of Crenshaw, demonstrated an 8-horse hitch at the Panola County Fair. This hitch included 4 registered Percheron mares, 3 grade mares, and a registered Percheron stallion. The mares in this team had 4 young foals at side, 3 eligible to registry. Three yearling mules produced by mares in this team were also shown. Two pairs from this team have been used in breaking and in tending 125 acres of corn during the past winter and spring. Large hitch demonstrations are being planned for the Farm and Home Week this summer.

Oktibbeha and Panola Counties have organized 4-H mule colt clubs, the colts to be shown at fall and spring shows. Exhibits at Sardis, Panola County, May 23, 1935, included 30 brood mares, 40 home-grown mules, 10 jacks, and 13 stallions. Lexington and Eupora also have put on splendid colt shows during the past two or three years, and colt classes have become an increasingly important feature of many county shows. Holmes, Yazoo, Franklin, and a number of other counties have brought in from 100 to 200 mares per county. Approximately 3,000 brood mares, 150 jacks and 50 stallions were

brought into the State from 1933 to 1935, inclusive, as the result of extension activities. A good many jacks and stallions are being brought into the State at this time, and the tendency is towards an improvement in the quality of animals purchased.

Sheep work started in 1918 was of a fundamental nature and was responsible for improvement in spring-lamb production in present spring lamb areas. Using registered mutton rams, retaining for flock improvement the earlier and growthier ewe lambs, breeding ewes for December, January, and February yearling, castrating and docking, and wool grading and cooperative marketing of wool and lambs, were among the practices demonstrated. This work has been followed up by the county agents with the assistance of the animal husbandmen.

Arrangements are in progress for a spring fair circuit and the organization of State cattle breeders is being planned to show high-class breeding stock in at least three places in the State.

Plans are also under way for the rejuvenation of some of the larger fall shows, along lines designed to encourage State exhibitors to participate and to help fix in the minds of producers breeding and commercial cattle standards of excellence.

The type of animal husbandry demonstrations in Mississippi, in the order of their distribution over the State are 4-H club, meats, pasture and grazing, wintering, registered sire work, shows and fairs, parasite control, finishing, registered herd work, and judging contests. County agents, at the last annual county agents' meeting, were unanimous in indication of interest in 1936 animal husbandry projects, 584 county requests being filed for animal husbandry demonstration work at that time.

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#### SPRING STALLION SHOWS IN INDIANA

District stallion shows were held in Indianapolis, Richmond, and Muncie this spring. Twenty-nine exhibitors from eight counties showed 43 head in the Muncie show. The local Chamber of Commerce financed the event at Muncie. At Richmond, business men of the city provided funds for the exhibit of 38 horses. Interest was good at all three points.

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#### NEW B. A. I. DIVISION

On May 1, 1936, an Animal Nutrition Division was created as a new administrative unit of the U. S. Bureau of Animal Industry with Paul E. Howe as chief. Dr. Howe was also made an assistant chief of the Bureau.

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## MORE FEDERAL RESEARCH RESULTS

(Excerpts from the 1935 annual report of the Chief, Bureau of Animal Industry to the Secretary of Agriculture).

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### Meat

Data on 831 hogs varying widely in type, breeding, age, weight, and degree of finish showed an interesting relation between type of hog and plumpness or development of ham. Just prior to slaughter each hog was judged for type and for plumpness of ham and other characteristics by a committee of three. In addition, certain measurements were taken on each chilled carcass, including ham circumference and length. The ratio between the two ham measurements was used as an index of plumpness. In general, as type changed from large to small there was an attendant increase in the plumpness of the hams, as indicated both by the index and committee judgment. For example, the hogs of small-plus type showed about 27 percent more plumpness of ham than those of large-plus type, according to the index.

Ham plumpness, as measured by the above-mentioned index, was found to be associated with the proportion of separable fat of the ham. In this study 140 hogs were used which varied widely in type and breeding but ranged only from 215 to 234 pounds in final feed-lot weight. Even closer relationship was found between the percentage of total edible meat, including both lean and fat, and plumpness.

A biometrical study of the carcasses of 831 hogs which varied widely in breeding, type, age, finish, and other characteristics showed a closer relation between average width of carcass, through hams and shoulders, and depth of carcass at the seventh dorsal vertebra, than between average width of carcass and its length from the first rib to the aitch bone, or between depth and length. The results support the general observation that in the growth of the hog the widening and deepening of the body are closely associated and neither of them as closely accompanies the development of length of body. They also suggest that in swine-improvement work there would be a rather definite tendency for any increase in proportionate width to be accompanied closely by an increase in depth, or vice versa, but that there would not be this close association between width or depth and length.

Comparison was made of fresh skim milk, dried skim milk, and tankage as protein supplements in fattening-hog rations, which consisted otherwise of barley 2 parts, corn 1 part, wheat 1 part, and

minerals, to study principally their relative influence on the palatability factors of the meat. The proportion of protein was practically the same in the three rations. The hogs were slaughtered when they individually reached the final feed-lot weight of approximately 225 pounds. Standard loin samples were roasted and graded for palatability. In general the pork from the hogs fed the fresh skim-milk ration was superior in palatability to the pork from the hogs fed the dried skim milk and tankage rations. Differences were small but the trend was so consistent, including the factors of tenderness, intensity and desirability of flavor of lean, desirability of flavor of fat, and richness of juice, that further work seems well justified to establish more definitely the possibilities of fresh skim milk in the production of high-quality pork.

## Beef Cattle

### Breeding

In crossbreeding experiments at the Iberia Livestock Experiment Farm, Jeanerette, La., in cooperation with the Louisiana Agricultural Experiment Station, in which Aberdeen-Angus cows have been bred to Guzerat bulls, the first generation of crossbreds have greater size and weight for age than purebreds. The polled characteristic is dominant in about 30 percent of the first-cross heifers and in less than 5 percent of the first-cross bulls. However, all the offspring from such heifers bred back to the Aberdeen-Angus bulls have so far been polled. The black color of the Angus appears to be dominant.

### Feeding

Three years of tests have been made at Grain Valley, Mo., in which fall calves were creep-fed, previous to weaning, on a mixture of 8 parts shelled corn and 1 part cottonseed meal by weight, with and without 1 part of a molasses feed. These tests showed that the addition of about one-half pound of a molasses-feed mixture to the ration increased the sales value of the calves at weaning time but not sufficiently to offset the increased cost of gains. The addition of molasses increased the appetite of the calves somewhat. The comparison was carried through the fattening period with the conclusion that the relative prices of corn and molasses feed will determine whether the addition of molasses is advisable for replacing a portion of the corn in the ration. In the first year, with corn valued at 43 cents a bushel and molasses feed at \$22 a ton, the feed cost per 100 pounds of gain was 70 cents less for the nonmolasses-fed group, but with corn at 70 cents a bushel and molasses feed remaining at \$22 a ton, during the second year's test, the addition of the molasses feed resulted in \$1.29 lower cost of 100 pounds of gain.

The first year's detailed steer-feeding investigation in cooperation with the Bureau of Plant Industry and the Texas Agricultural Experiment Station was completed at Big Spring, Tex. Twenty steers were fed individually and 20 as a group on ground milo heads, cottonseed meal, and sumac sorghum fodder for 180 days. Yearling steers fed individually made an average total gain of 388.3 pounds as compared with 427.7 as the average for the group-fed steers. The difference of 39.4 in gain per head is significant. In feed requirements per 100 pounds of gain in weight, the individually fed steers consumed on the average 489.2 pounds of digestible nutrients as compared with 527.7 pounds by the group-fed steers. The difference of 38.5 pounds is significant and is possibly accounted for by the observation that more exercise was taken by the group-fed steers. Each individually fed steer was confined in a pen 5 by 40 feet in size, whereas the group-fed steers had access to the same total area of ground.

### Management

At the McNeill (Miss.) Experiment Station, in cooperation with the Bureau of Plant Industry, the Forest Service, and the Mississippi Agricultural Experiment Station, the effects of grass fires on the soil and on growth of forage were studied. Analyses of the soil of virgin longleaf pineland to the depth of plant-root growth, after 8 years of burning and nonburning, showed that an area burned annually was about one and one-half times as rich in organic matter and nitrogen as a similar area not burned. Increased growth of grasses and legumes occurred on the burned areas.

In the management of beef herds for calf production, experiments at Lewisburg, W. Va., conducted in cooperation with the West Virginia Agricultural Experiment Station, showed that spring calves, produced on highly productive farming land, and creep fed previous to weaning, returned \$26.88 for the keep of the cow after the cost of supplemental feed had been deducted. Similar calves, not creep fed, placed in the dry lot in November, and fattened until March 1, returned \$32.66 per calf. Calves produced on mountainous pasture land had a value of \$25.02 per calf as feeders at weaning time in November. These data, as well as those of the preceding year, indicate that the fattening of calves, either on supplemental feeds previous to weaning or by feeding in the dry lot immediately after weaning, can be made a profitable business, under conditions such as existed in 1933 and 1934. On highly productive farm land in the Appalachian region such an enterprise appears to be more profitable than the production of feeder calves on the mountainous areas.

Pasture management and grazing studies at the Georgia Coastal

Plain Experiment Station in cooperation with the Bureau of Plant Industry show that a mixture of carpet grass, Dallis grass, lespedeza, and white clover is a satisfactory lowland permanent pasture. The results of fertilizer experiments with this combination of plantings indicate that the lowland pastures of the Coastal Plain area need an application of phosphorus. When a complete fertilizer was applied at the rate of 600 pounds an acre, a gain of 298 pounds of beef was made per acre as compared with 91 pounds of gain on a pasture of carpet grass and lespedeza when no fertilizer was used. In the case of upland permanent pastures Bermuda grass and lespedeza continue to give much better yields than centipede grass and lespedeza. The centipede-grass pasture has been divided. One area was fertilized. The fertilized area is maintaining the animals much better than the unfertilized area.

#### Beef Studies

In connection with the record-of-performance studies at Beltsville, Md., 12 beef calves slaughtered at 900 pounds of live weight graded, on the average, low Choice as feeders and top Good as slaughter calves and in carcass. The quantity of cold dressed beef produced per 100 pounds of digestible nutrients fed averaged 17.1 pounds and ranged from 13.9 to 21.9 pounds. The data indicate a close association between weaning weight and pounds of dressed beef per given quantity of feed, as the latter was consistently higher in the case of the calves having the heavier weaning weights.

Twenty-seven Milking Shorthorn steers slaughtered at Beltsville, Md., at 900 pounds of live weight graded low Good as feeders, on the average, and the top of Medium at slaughter and in the carcass. For every 100 pounds of total digestible nutrients consumed, 15.1 pounds of cold dressed beef was produced on the average, with a range of 10.46 to 18.7 pounds.

#### Sheep

##### Farm Sheep

At the United States Morgan Horse Farm, Middlebury, Vt., lambs sired by Southdown rams and from ewes of the Corriedale breed and the cross between the Dorset and the Tasmanian Merino breeds were more satisfactory as hot-house lambs than purebred Dorset and Dorset x Tasmanian Merino crossbred lambs. In percentage of lambs produced, the Dorset x Tasmanian Merino crossbred ewes ranked first and were followed by purebred Tasmanian Merinos, Corriedales, and Dorsets. The results obtained indicate that some inheritance of fine-wool sheep in the ewe stock is essential to get lambing



percentages large enough to make specialized hothouse-lamb production profitable. Southdown rams seem to have special merit for the siring of lambs of the superior quality demanded by the specialized trade.

#### Range Sheep

Experience at the United States Range Livestock Experiment Station, Miles City, Mont., with the wintering of ewe lambs in the feed lot for a 90- to 120-day feeding period on an alfalfa-hay and whole-wheat ration has indicated the lack of a balanced mineral diet. To determine whether this condition existed in lambs fed alfalfa hay without grain, 370 ewe lambs were divided, in January 1935, into two lots of equal numbers. One lot was fed alfalfa hay and salt; the other was fed the same quantity of alfalfa hay and bone meal and salt in the ratio of 1 pound of bone meal to 4 pounds of salt. Body weights taken at the beginning and end of an 86-day feeding period indicated no effect resulting from the bone-meal supplement, but the rate of salt consumption of the two lots varied greatly. The lambs fed the bone-meal supplement consumed 120 pounds of salt and 30 pounds of bone meal, whereas the other lot consumed 288 pounds of salt, or nearly twice as much as the mineral mixture.

#### Swine

The first litters from the Danish Landrace and Danish Yorkshire hogs, imported in 1934 for experimental studies, were farrowed at Beltsville in the fall of 1934. Seven Landrace sows farrowed an average of 9.1 pigs per litter, whereas three Danish Yorkshire sows farrowed an average of 14.7 pigs per litter. A total of 36 sows of the Chester White, Duroc-Jersey, and Poland China breeds farrowing fall litters in all other projects averaged 7.2 pigs per litter. The average production of the Danish Yorkshire sows was increased considerably by the record of one sow, which farrowed 21 pigs (20 living and 1 dead). This sow has since farrowed a spring litter, sired by a different boar, of 16 pigs, 14 of which were alive and 2 dead at birth, making 34 living pigs for her first two litters. This sow's pedigree shows an ancestry noted for prolificacy. Her dam farrowed 44 pigs in 3 litters, an average of 14.7 pigs a litter. Her granddams, including the great-granddams, averaged from 11 to 12.8 pigs a litter in a total of 44 litters.

The fall-farrowed pigs from these Danish sows were fed in dry lot under record-of-performance conditions from 72 days of age to individual weights of approximately 225 pounds. The pigs were divided into four lots; one lot contained the Landrace pigs sired by a B-family boar, another lot the pigs sired by an F-family boar, a

third lot the pigs of mixed Landrace breeding, and a fourth lot the pigs of Danish Yorkshire breeding. The average daily gains per pig for the different groups varied from 1.37 to 1.53 pounds, and feed consumer per 100 pounds of gain ranged from 342.9 to 374.8 pounds.

Five pairs of Poland China litter mates were hand-fed individually from weaning to final weight of approximately 225 pounds. The pigs were so selected that there was a 1-pound difference in birth weight between the two pigs in each pair. The results indicate a direct relationship between birth weight and the rate and economy of gains. As shown by the average of the five pairs, the heavier pigs made 0.2 pound more daily gain with a saving of 44 pounds of feed per 100 pounds of gain.

Crossbreeding studies were concluded at the United States Range Livestock Experiment Station, Miles City, Mont. Purebred Yorkshire, Duroc-Jersey x Yorkshire, purebred Chester White, Duroc-Jersey x Chester White, Chester White x Duroc-Jersey, and Yorkshire x Duroc-Jersey were included in this year's work. The birth weight of the crossbred pigs averaged 0.24 pound more than that of the purebred pigs. At the close of the feeding test the Chester White x Duroc-Jersey hogs were the heaviest, averaging 231 pounds at an average age of 179 days. The purebred Yorkshire hogs were the lightest, averaging 199 pounds at an average age of 180 days. In the other four groups, there was little difference in the weight at approximately the same age. The purebred Yorkshire pigs made the most economical use of feed, with the Duroc-Jersey x Chester White pigs ranking next. It is noteworthy that the crossbred pigs were about as uniform in weight as the purebred pigs, at approximately the same age. At market the carcasses of the Chester White x Duroc-Jersey and Purebred Chester White pigs graded slightly higher than those of the other lots.

Studies begun at Miles City in 1930 on the birth weight of pigs were continued. Of the live pigs farrowed in the spring of 1934 weighing less than 3 pounds, 75 percent reached weaning age, whereas 92 percent of those weighing more than 3 pounds reached weaning age. The weaning weight, at 70 days, of the pigs weighing less than 3 pounds at birth averaged 43.8 pounds, as compared with 48.5 pounds for those weighing more than 3 pounds at birth. These data are in general agreement with data of previous years.

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## RECENT PUBLICATIONS

(Only Federal publications are available from Washington. Others listed may be obtained in most instances from the institution or agency issuing them).

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"Feeding Cottonseed Products to Livestock" by Sheets and Thompson - U.S.D.A. Farmers' Bulletin 1179. 14 pages. 2 illus. (revised) 1935.

"Grass in Soil Erosion Control" by Carrier - U.S.D.A. Soil Conservation Service. 15 pages. Mimeo. 1936.

"Growing and Utilizing Sorghums for Forage" by Binall and Getty - U.S.D.A. Farmers' Bulletin 1158. 32 pages. 17 illus. (revised) 1936.

"Hogs" (Economics Handbook For Use of State Extension Specialists)- U.S.D.A. Division of Cooperative Extension in cooperation with Bureau of Agricultural Economics. 25 pages. Mimeo. Graphs and tables. 1936.

"Improvement of Permanent Pastures" by Carrier - U.S.D.A. Soil Conservation Service. 5 pages. Mimeo. 1936.

"Livestock for Small Farms" by Erskine - U.S.D.A. Farmers' Bulletin 1753. 32 pages. 10 illus. 1936.

"Market Classes and Grades of Lambs and Sheep" by Burk, Gibbons, and Foster - U.S.D.A. Cir. 383, Bureau of Agricultural Economics. 34 pages. 15 illus. 1936.

"Mineral Requirements of Animals" by Howe - U.S.D.A. Bureau of Animal Industry, A.H.D. No. 17 rev., Jan. 1936. 3 pages.

"Soil Conservation - Its Place in National Agricultural Policy" - U.S.D.A. Agricultural Adjustment Administration. 27 pages. May 1936.

### State

"Inexpensive Silos for Kansas" by Linn, Ward and Seath - Kansas Extension Service Circular 94 (Revised). Sept. 1934. 14 pages. 16 illus.

"The Effect of the Plane of Nutrition of Ewes upon Their Wool, Lamb, and Milk Production" by Snell - Louisiana Experiment Station Bulletin No. 269. Jan. 1936. 23 pages. 9 illus.

"Pasture Production and Management" by Lush - Louisiana Experiment Station Circular 15. Jan. 1936. 10 pages.

"Fattening Thin Native Lambs" by Hunt - Maryland Experiment Station  
Bulletin No. 379. July 1935. 82 pages. 8 illus.

"Fitting and Showing Sheep" by Phillips - Massachusetts  
Extension Service Leaflet No. 159. Feb. 1936. 12 pages. 9 illus.

"The Home Meat Supply" by Brown and Westveld - Michigan  
Extension Service Bulletin No. 151. Nov. 1935. 56 pages. 25 illus.

"Trench Silo for Beef Production in Mississippi" by Newell  
and Goodell - Mississippi Extension Service Circular No. 83. Feb.  
1936. 8 pages. illus.

"The Good Use of Farm Land in Missouri" by Etheridge -  
Missouri Extension Service Circular 332. Dec. 1935. 8 pages. illus.

"Castrating and Docking Lambs" by Ewing and Foster - Missouri  
Extension Service Circular 331. Dec. 1935. 4 pages. 3 illus.

"The Missouri Plan of Sheep Improvement" by Ewing and Burch -  
Missouri Extension Service Circular 333. Jan. 1936. 16 pages.  
4 illus.

"Vitamin A Deficiency - A Cause of Lameness and Death Among  
Swine" by Hostetler, Foster, and Halverson - North Carolina Experiment  
Station Technical Bulletin No. 52. Oct. 1935. 31 pages. 14 illus.

"Some Effects of Breeding Ewe Lambs" by Briggs - North  
Dakota Experiment Station Bulletin 285. Jan. 1936. 28 pages. 9 illus.

"Fattening Steer Calves" by Gerlaugh

"Corn-and-Cob Meal Versus Shelled Corn for Fattening Yearlings  
and Calves" by Gerlaugh and Rogers

"Corn-and-Cob Meal Versus Shelled Corn for Fattening Yearlings  
and Calves" (Summary) by Gerlaugh and Rogers

"Relative Efficiency and Profitableness of Three Classes of  
Feeder Cattle. V." by Gerlaugh and Gay

"Adding Supplement to Corn for Calves on Bluegrass Pasture" by  
Gerlaugh.

Above contained in - Ohio Experiment Station Bimonthly Bulletin  
No. 179, Vol. XXI. Mar.-Apr. 1936.

"The Physical Characteristics of Wool Fibers From Different  
Breeds of Sheep" (Correlation studies) by Darlow and Craft - Oklahoma  
Experiment Station Bulletin No. 225. Sept. 1935. 20 pages.

"Care and Management of Swine" by Thompson - Oklahoma  
Extension Service Circular 225. Rev. 1935. 32 pages. illus."

"The Marketing of Country-Dressed Meat in Portland" by  
Rodenwold, Oliver, and Potter - Oregon Experiment Station Bulletin  
339. June 1935. 22 pages.

"A Planned Farm Program" by McLeod and Holmes - Tennessee  
Extension Service Publication 187. Rev. Jan. 1936. 4 pages.

"The Hardness of Cottonseed Cake as Related to its Suit-  
ability for Feeding" by Fraps and Marrs - Texas Experiment Station  
Bulletin No. 523. Mar. 1936. 27 pages.

"Feed for Profit" - Utah Extension Service Circular 81.  
Mar. 1936. 28 pages. illus.

"Take Care of the Work Horse" by Beach - Wisconsin Extension  
Service Special Circular. Jan. 1936. 4 pages. illus.

"4-H Colt Club Work - Projects 1, 2, and 3" - Wisconsin  
Extension Service Special Circular. Feb. 1936. 16 pages. illus.

"Steer Feeding in Southeastern Wyoming" by Roath - Wyoming  
Experiment Station Bulletin No. 212. Nov. 1935. 20 pages. illus.

#### Other

"This Little Pig Went to Market ... Safely" - Livestock Loss  
Prevention Association of Ohio, Columbus, Illus. Leaflet.

"Horses and Riders" - Horse and Mule Association of America,  
407 S. Dearborn St., Chicago, Ill. 23-page bulletin. Illus.

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#### TENNESSEE WOOL POOL SALE

C. C. Flanery, Tennessee sheep specialist, reports the sale  
of 95,000 pounds of clear wool by the Gallatin pool on May 19 at  
40 cents per pound.

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